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found similar situations in humid climates generally. The chief categories of natural formations are halophile, subalpine, alpine, and the sea-fowl cliffs, and all but the latter are further subdivided. The halophytic formations are much as elsewhere, and the subalpine formations are mainly those of ponds, swamps, moors, heaths, and cliffs. The cliffs are of much interest, since there is a luxuriant vegetation on sunny southern slopes, while there is a poorer vegetation, mainly of shade mosses, on north slopes. Of rather more interest than usual are the culture formations, the most important of which is the grass meadow. One of the most striking features of the islands is the roof vegetation, which has always been mentioned by travelers; the inhabitants thatch the roofs with grass turf, and very characteristic roof associations develop. The custom of the people is to sow potatoes in cleared ground for two years, after which barley is grown, whereupon the field is left fallow; under the heading "Metamorphic formations," OSTENFELD traces the history of such areas into the grass meadow.—H. C. COWLES.

Some plant diseases.—LANG¹⁵ has given a detailed account of the biology of *Ustilago Triticis* Jens., which, as BREFELD has shown, is peculiar and almost unique among the fungi on account of its habit of infecting the ovule and remaining dormant in the seed until the latter germinates. LANG finds that the spores of this fungus placed upon the stigmas of wheat flowers just opened germinate readily, but the germ tubes show no tendency to penetrate the stylar tissue. Only when the papillae of the stigma have begun to wither and collapse can the germ tubes penetrate between the cells. The fungus apparently has no power of penetrating the sound turgid tissue, a fact which has an interesting bearing in view of the usually strict parasitism of the vegetative phase in this group. The germ tube, without branching, makes its way down the intercellular spaces of the style, or sometimes down the canal formed by the pollen tube, and penetrates the inner integument near the micropylar end, the outer integument having mostly disappeared by that time. When the hyphae reach the chalazal region, they become branched and nodular, apparently showing greater vigor of growth in the region of more abundant nourishment. About three weeks after infection the fungus has reached the embryo. At first it spreads through the scutellum, but later the mycelium pervades every part of the embryo except the radicle. This stage is attained simultaneously with the ripening of the grain. The mycelium remains dormant in the ripe seed, and, when the latter germinates, progressively infects the growing points of the plant, but causes no apparent injury until spores are formed in the ovaries.

GÜSSOW¹⁶ reports the appearance in Newfoundland of a potato disease known as "cauliflower disease" or "potato-canker." The disease is caused by a chytri-

¹⁵ LANG, WILHELM, Die Blüteninfektion beim Weizenflugbrand. Centralbl. Bakt. II. 25:86-101. pl. 1 (double). figs. 2. 1909.

¹⁶ GÜSSOW, H. T., A serious potato disease occurring in Newfoundland. Cent. Exp. Farm, Depart. Agric., Ottawa, Canada. Bull. 63. pp. 8. pls. 2. fig. 1. 1909.

diaceous fungus, *Chrysophlyctis endobiotica* Schilberszky. It has been known in Europe for a long time, but has not hitherto been reported as occurring in America. The present article gives a general description of the disease, with figures showing its character. The purpose of the paper is one of warning, to enable farmers in the Dominion to recognize the trouble and prevent its introduction and spread into Canada.

Three fungous diseases of plants, not before reported, are briefly described by OSTERWALDER.¹⁷ He finds that a disease of *Levisticum officinale* Koch., affecting the leaves and stems on which it appears in the form of spots, is caused by a bacterium which is described as *Pseudomonas Levistici*. He was able to produce infections from pure cultures, but only in wounds. A disease of *Calceolaria rugosa* Hort., characterized by rotting of the stems at the ground, is ascribed to *Phytophthora omnivora* DeBary. *Sclerotinia Libertiana* Fuckel is described as attacking *Omphalodes verna* during wet weather.—H. HASSELBRING.

Chemotaxy.—ÅKERMAN¹⁸ studied the chemotactic responses of the sperms of *Marchantia* by the usual capillary tube method. They react strongly positively to the ions of potassium, rubidium, and caesium (agreeing with the behavior towards proteins as found by LIDFORSS¹⁹), and weakly to magnesium and ammonium. They are indifferent to sodium and calcium, and react negatively to the ions of hydrogen and zinc and to the bivalent ions of mercury, iron, and copper. In a potassium-free medium the tubes must contain at least 1/1000 mol. KNO₃ in order to attract, while in a potassium-containing medium the tube must have 40 times the concentration of the potassium shown by the medium. The corresponding gradient for proteins is 20. No evidence of osmotaxy was found in the organism. The tactic responses were greatly disturbed by gaseous impurities of the laboratory and by lack of oxygen.

KUSANO²⁰ has published a full statement of his work in the chemotactic and related reactions of the swarmspores of *Myxomycetes*. It is characterized by excellence of experimentation, critical consideration, and clear statement of results. *Aethalium septicum*, *Stemonitis jusca*, and *Comantricha longa* were the forms used. It was found that the activity and responses of the spores are not at all affected by a great decrease in oxygen, so the capillary method was used with a cover glass. All acids attract and bases repel; while neutral substances, if of moderate concentration and not highly toxic, act indifferently. Sodium hydrate

¹⁷ OSTERWALDER, A., Unbekannte Krankheiten an Kulturpflanzen und deren Ursachen. Centralbl. Bakt. II. 25:260-270. pls. 2. 1909.

¹⁸ ÅKERMAN, ÅKE, Ueber die Chemotaxis der *Marchantia* Spermatozoiden. Zeit. für Bot. 2:94-103. 1910.

¹⁹ LIDFORSS, B., Ueber die Reizbewegungen der *Marchantia* Spermatozoiden. Jahrb. Wiss. Bot. 41:65-87. 1905.

²⁰ KUSANO, S., Studies on the chemotactic and other related reactions of the swarmspores of *Myxomycetes*. Jour. Coll. Agr. Imp. Univ. Tokyo 2:1-83. 1909.